

## CLAIMS

1. Device for investigating reactions between interactive species, said device comprising:
- one or more plasma deposited layers, which layers comprise one or more first pre-selected functional group species, which functional group species are interactible with a pre-selectable second species.
2. Device according to claim 1 wherein the plasma deposited layer is supported on a substrate.
3. Device according to claims 1 or 2 further comprising a film of a free electron metal, preferably selected from the group consisting essentially of copper, silver, aluminum and gold.
4. Device according to claim 3 wherein the plasma deposited layer is arranged directly on the free electron metal film.
5. Device according to any of the previous claims, wherein the plasma deposited layer, comprises one or more chemical and/or biological functional groups.
6. Device according to claim 5, further comprising one or more wet chemically deposited layer(s), arranged on the plasma deposited layer.
7. Device according to any of the preceding claims wherein the plasma layers comprise one or more amine compounds and/or one or more sulphur compounds, preferably thiols, sulfides and/or disulfides and most preferably being diallyl sulfide.
8. Device according to claim 7, wherein the substrate consists essentially of gold.
9. Process for providing a device according to any of the previous claims, comprising the step of depositing a gas plasma layer onto a pre-selected substrate in order to provide the substrate with a predetermined functionality.

16. Process according to claims 14-15 wherein following pulse discharge, the substrate is after-treated with a pre-selected gas, which gas optionally comprises the one or more functional groups which have been plasma deposited.

17. Process for providing a device according to any of the preceding claims 9-16, suitable for investigating reactions between interactive bio/chemical species by means of surface plasmon resonance

5 spectroscopy, said process comprising the steps of:

- preselecting a free electron metal substrate, which metal substrate is suitable for allowing investigation by surface plasmon resonance spectroscopy, arranging a preselected first functional group species on the free electron metal substrate by means of plasma deposition, which first functional group species protects the free electron metal substrate from a second functional group species whose interaction with the plasma deposited first functional group species can be investigated, thereby preventing undesirable interactions between the free electron metal substrate and the second functional group species, and which first functional group species provides a desired functionality for the second functional group species, and

20 - subsequently arranging a second functional  
group species on the plasma deposited layer of the first  
functional group species, whereafter interaction between  
the first and second functional group species layers, can  
be investigated by means of surface plasmon resonance  
25 spectroscopy.

18. Process for providing a device according to any of the preceding claims 9-17, suitable for investigating reactions between interactive bio/chemical species by means of surface plasmon resonance

30 spectroscopy, said process comprising the steps of:

35 - preselecting a free electron metal substrate, preferably being gold, which metal substrate is suitable for allowing investigation by surface plasmon resonance spectroscopy, arranging a preselected first functional group species on the free electron metal substrate by means of plasma deposition, which functional group species preferably is selected from a sulphur compound, which first functional group species protects the free

WO 00/10012

PCT/NL99/00504

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electron metal substrate from a second functional group species whose interaction with the plasma deposited first functional group species can be investigated, thereby preventing undesirable interactions between the free  
5 electron metal substrate and the second functional group species, and which first functional group species provides a desired functionality for the second functional group species.

19. Process according to claim 17 or 18,  
10 wherein before being exposed to the second functional  
group species, a bio/chemical functional layer is wet  
chemically arranged on the plasma deposited first  
functional group species layer, said wet chemically  
arranged functional layer being preselected for its  
15 specificity for the second functional group species and  
for the prevention of non specific interactions with the  
said second functional group species.

20. Device according to claims 1 to 8,  
obtainable according to a process according to any of the  
20 claims 9-19.

21. Process for investigating the interaction, for example real time surface interaction, of pre-determined chemical and/or biological species, comprising the steps of analyzing the interaction between the species arranged on a device according to any of the claims ~~1 to 8~~ and/or 20.

22. Use of a device according to any of the claims 1-8, and/or 20 for investigating the reaction between chemically interactive species, and especially 30- for use in SPR.

23. Use of a device for investigating reactions between interactive bio/chemical species, by means of surface plasmon resonant spectroscopy, said device comprising a preselected free electron metal substrate, and a preselected, plasma deposited layer arranged on the free electron metal substrate, which plasma deposited functional group species is chosen for its attachment ability to the free electron metal substrate, and for its

